

**REVISION OF THE AUSTRALIAN VITACEAE,
1. AMPELOCISSUS PLANCHON**

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Summary

A new species of *Ampelocissus*, *A. frutescens* is described and a new combination *A. gardineri* based on *Vitis gardineri* Bailey is made. A description of the genus and of each of the three species is given, together with a key to the species.

The family comprises 12 genera which are found mainly in the tropics and subtropics of the world. Five of these genera occur in Australia, with *Clematicissus* endemic to Western Australia. The family is easily recognised because it consists mostly of vines with leaf-opposed tendrils, however generic limits are not easily defined because of the tremendous variation that occurs in leaf characters and the constancy of reproductive structures as well as the difficulty in obtaining fertile material. A description of the family as well as a key to the genera in Australia has been given by Jackes (1983).

AMPELOCISSUS

Ampelocissus Planchon, Vigne Amer. 8:371 (1884) *nom. cons.*; in DC. Monogr. Phan. 5:368 (1887).

Botria Loureiro, Fl. Cochinch.:153 (1790); Merrill, Comment. Lour. Fl. Cochinch.:253 (1935). *nom. rej.*

Bothrya Jussieu, Mem. Mus. Paris 3:444 (1817). *ortho. var.*

Vines or occasionally erect shrubs bearing leaf-opposed tendrils; tendrils frequently bifurcate rarely present at every node; aerial portion produced annually from perennial tuberous rootstock which develops from adventitious roots arising in the axils of the cotyledons. Leaves alternate; in Australian species, pedate with 3–11 leaflets, sometimes imperfectly divided, margin usually shallowly serrated except when very young, leaves in extra-Australian species may be simple, digitate 3–5–foliolate, or pedate, margins entire or variously lobed. Stipules 2, caducous. Degree and type of pubescence on aerial parts varies between species. Inflorescence generally a large, multiflowered panicle, occasionally cymose or contracted to form clusters, in most species a tendril is associated with the inflorescence and arises in the axil of the first bract on the rachis. Peduncles and pedicels subtended by bracts. Flowers usually bisexual, small, pentamerous rarely tetramerous, buds not swollen. Calyx cup-shaped, usually 5–lobed. Petals 5 free, spreading, valvate, adhering in bud by the interlocking epidermal cells, cucullate at the apex, covering anthers before anthesis. Stamens inserted on the receptacle at the base of the disc, opposite the petals, filaments erect often flattened, anthers introrse, dorsifixed opening by longitudinal slits. Pollen grains tricolporate. Disc adnate to and entirely surrounding the ovary, 5–10–ridged. Ovary 2–locular with 2 anatropous basally attached ovules per locule. Style short, conical, often striate; stigma minute, flat or depressed at the summit of the style. Berry fleshy, with 2–4 dorsiventrally compressed boat-shaped seeds. Seeds in transverse section vary according to the number maturing in the fruit, often somewhat 3–angled; the dorsal side has a central flattened area formed by the perichalaza, two large furrows either side of the raphe occur on the ventral surface, horizontal ridges run from the dorsal to the ventral side. Endosperm in transverse section T-shaped. Mucilage cells and raphide sacs, also often with mucilage, appear to be present in all organs.

Type: *A. latifolius* (Roxb.) Planchon.

Like all members of the Vitaceae, species of *Ampelocissus* show a great range of variation particularly with respect to size and shape of leaves, and types and distribution of trichomes. Since leaf size and degree of pubescence are influenced by age and habit, it is essential whenever possible to compare specimens of similar age because, for example, old leaves of normally pubescent species may be glabrous.

The combination of characters distinguishing *Ampelocissus* from other genera of the family are: inflorescence usually a large panicle bearing a tendril on the rachis; pentamerous hermaphrodite or polygamous flowers; corolla not swollen in bud; stamens erect before anthesis and hidden under the hooded apex of the petals; endosperm T-shaped in transverse section. Whilst reproductive characters may be used to distinguish between genera, there is insufficient variation in them to delimit species.

According to Galet (1967) there are 94 species, most of which occur in the African and Asian tropical and subtropical areas. Four species are reported from Central America. In the immediate vicinity of Australia there are five species: in Timor, *A. aculeata* (Spanoche) Planchon, leaves pedate with cobwebby hairs and prickly stems; *A. arachnoidea* (Hassk.) Planchon, leaves simple covered with dense cobwebby hairs; *A. barbata* (Wall.) Planchon, leaves simple, inflorescence much contracted; in New Guinea; *A. ochracea* (Teysm. & Binn.) Merrill & Rolfe, leaves simple covered with cobwebby hairs often reddish, flowers sessile; *A. muelleriana* Planchon, leaves trifoliate with pale cobwebby hairs, laterals strongly serrated on the lower margin. *A. acetosa* (F. Muell.) Planchon, occurs both in Papua New Guinea and Australia.

Pollen grains from at least five localities per species were examined and the percentage of aborted pollen grains recorded. Ten to twenty percent appeared to have aborted in both *A. acetosa* and *A. frutescens*, whilst in *A. gardineri* approximately fifty percent had aborted.

Key to the Species

1. Inflorescence branches usually 2–3; glabrous or with short hairs only, mature leaves glabrous or sparsely pubescent **A. acetosa**
- Inflorescence branches usually 5–9, rarely glabrous, mature leaves with cobwebby and short hairs 2
2. Cobwebby hairs rusty-coloured, vine, leaves 9–11 pedate **A. gardineri**
- Cobwebby hairs pale or colourless, shrub or occasionally a vine, leaves 3–7 pedate **A. frutescens**

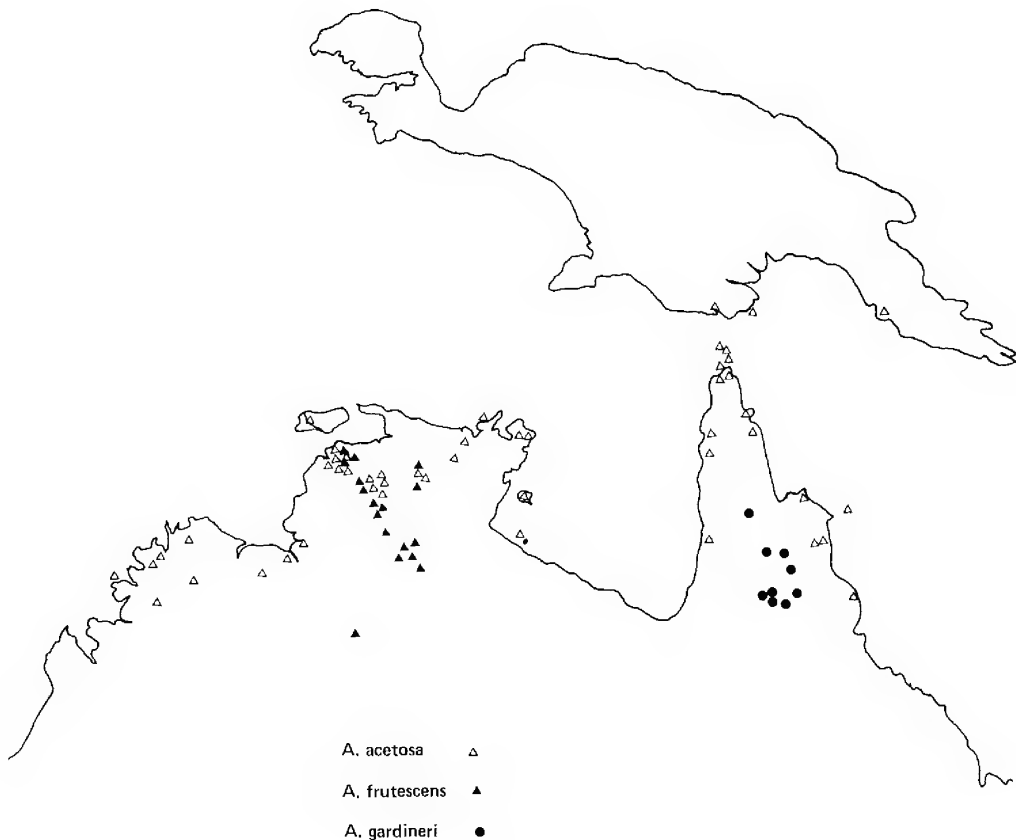
1. *Ampelocissus acetosa* (F. Muell.) Planchon, Vigne Amer. 96 (1885) (Figs. 1–7).

Cissus acetosa F. Muell., Trans. Phil. Inst. Vict. 3:24 (1859).

Vitis acetosa (F. Muell.) F. Muell., Pl. Vict. 1:94 (1862); Benth. Fl. Austral. 1:449 (1863); F. M. Bailey, Qd Flora, 1:282 (1899).

Cayratia acetosa (F. Muell.) Domin, Fedde Repert. 11:264 (1912). **Syntypes:** North Coast, Brown (BM, E, K); Victoria River, Mueller (K, MEL); Fitzmaurice River, Mueller (K); Sweers Island, Henne (BM, K).

Tendrilled vine, mature plants glabrous or sparsely pubescent, hairs simple short, 1–3-celled, spines common on stem. Leaves pedate (5–)7–9(–11) leaflets: central leaflet obovate-cuneate occasionally narrow to broadly lanceolate, acuminate occasionally obtuse, (2.8–)7–10(–13) × (0.5–)1–4(–8) cm; lateral leaflets oblique, main laterals (3.4–)4–9(–12) × (0.5–)2–4(–6) cm. Central petiolule (0–)0.7–1.3(–2.3) cm long, lateral petiolule (0.5–)1.8–2.5(–3.6) cm long, petiole (0.5–)2–3.5(–5.4) cm long, rarely absent, leaflets with up to 19 shallow teeth on each side, margins occasionally tinged with red, lower surface often glaucous. Leaves usually glabrous at maturity, any remaining hairs are associated with main veins on lower surface. Stipules triangular, glabrous 2 mm long. Panicle usually with 2–3 primary branches; tendril usually present. Final divisions of the inflorescence either glabrous or somewhat puberulent. Pedicels terete (0.7–) 1 (–1.5) mm long, glabrous or with minute papillae. Calyx spreading, 5-lobed. Corolla lobes 1.5–2 × 1.2 mm, pale red to purplish red at maturity. Filaments 0.75–1 mm long, flattened, red; anther yellow 0.5 mm long. Disc 10-ridged, ovary 1.3–1.5 × 1.2 mm bearing a short conical style and minute flat or depressed stigma which expands after anthesis into 5 small lobes; locules 2, with 2 anatropous ovules per locule. Berry, ovoid, purplish-black to black, when dry 9–10 × 6–8 mm, 2–4 boat-shaped seeds per fruit, 7–9 × 3–5 mm. **Figs. 1–7.**



Map 1. Distribution of Australian species of *Ampelocissus*.

Papua New Guinea. WESTERN DISTRICT: Wassi Kussa River, Tarara, Jan 1937, *Brass* 8647 (A, BRI, K, L); Daru Island, Apr 1936, *Brass* 6448 (BRI, L). **Australia. Western Australia:** Mitchell Plateau, NW Kimberleys, Feb 1979, *Kenneally* (PERTH); Carson Escarpment, 29 km ENE Doongan Homestead, NE Kimberleys, Mar 1978, *Lazarides* 8663 (CANB, K); Heywood Island, Bonaparte Archipelago, May 1972, *Wilson* (PERTH); Kununurra, Feb 1951, *Gardner* (PERTH). **Northern Territory:** Banjo Beach, Melville Island, Jan 1966, *Stocker* (BRI, NT); North Goulburn Island, *Cunningham* (BM, E); Maningrida, in 1961, *Gressitt* 3660 (BRI); Giddy River Area, W of Gove, Jan 1973, *Hinz* 1281-73 (K, MBG, NT); Casuarina, Darwin, Feb 1979, *Cousins* 64 (DNA, JCT); Stuart Highway ca 48 km S of Darwin, Mar 1963, *Lazarides* 6833 (CANB, NT); Berry Springs, Apr 1977, *Parker* 751 (DNA, JCT); Humpty Doo, Feb 1961, *McKee* 8333 (K, NSW, NT); 1 mile [1.6 km] SW Cannon Hill, Feb 1973, *Martensz & Shodde* AE 665 (BRI, CANB, K, L, NT); Kapalga, Feb 1977, *Collins* 221 (CANB, DNA, JCT); Little Nourlangie Rock, Mar 1978, *Dunlop* 4770 (DNA, JCT); 1 mile [1.6 km] E Bamboo Pass Old Marrakai Rd., Dec 1968, *Byrnes* 986 (CANB); Hemiple Bay, Groote Eylandt, Apr 1948, *Specht* (BRI); Sir Edward Pellew Group, Feb 1973, *Craven*, 3842 (CANB, NT). **Queensland.** COOK DISTRICT: Badu Island, Torres Strait, Dec 1976, *Cameron* 2575 (QRS); Somerset, Dec 1897, *Jardine* (BRI); 5 km E of Weipa Mission, Dec 1974, *Specht & Salt* (BRI); Lockhart River Mission Station ca 12 miles (19 km) S of Cape Direction, Apr 1970, *Roger* (BRI); Aurukun, in 1962, *Webb & Tracey* 7777 (BRI); Lizard Island, Dec 1974, *Specht* (BRI); base of Black Mountain, SW of Cooktown, Dec 1965, *Rodd* 218 (NSW); Russell River Jan 1910, *Domin* 6414 (PR).

This species occurs in New Guinea and Northern Australia (Map 1) usually in dry monsoon forest, frequently growing on lateritic or sandy soils, rarely on heavy clay soils.

The specimens with the largest leaves occur in Western Australia. Leaves on Cape York and New Guinea specimens tend to have glaucous intercostal regions, margins are tinged with red and more deeply serrated; the apex is also more acuminate than in specimens from other areas. Three trichome types may be found on the leaves particularly when young, at maturity, hairs if present are usually restricted to the lower epidermis on the midrib and main laterals. These types are: simple, short 1-3-celled hairs with thickened walls; simple unicellular thin-walled very long and twisted cobwebby hairs, uncommon at maturity; simple two-armed unicellular hairs with thickened walls, arms usually equal, these are also uncommon.

A. acetosa is related to *A. aculeata* (Spanoche) Planchon, which is found in Timor, but it is easily distinguished by the inflorescence branches which are glabrous or sparsely puberulent, whilst the latter has numerous cobwebby hairs. Planchon (1885) considered that the presence of conical prickles on the stem of *A. aculeata* also distinguished it from *A. acetosa* where they are uncommon. However prickles, when they occur, are often not apparent on young branches and it is these which are commonly collected.

A. pauciflora Merrill, from the Philippines, is very similar to *A. acetosa* but no trichomes were present on those specimens that I examined. Also by comparison with *A. acetosa* the serrations on the leaflet margins of *A. pauciflora* are pronounced and the inflorescence bears fewer flowers. Reports indicate that prickles have not been found on the stem of *A. pauciflora*.

2. *Ampelocissus frutescens* B. R. Jackes, species nova affinis *A. acetosa* (F. Muell.) Planchon et *A. aculeata* (Spanoche) Planchon; ab illa pilis multis pallentibus arachnoideis in ramis inflorescentiae et in foliis praecipue in stipulis bracteisque et habitu plerumque fruticoso, ab hac foliolis grandioribus praeditis indenturis non profundis pluribus et necnon habitu fruticoso recedit. **Typus:** Mt Pleasant, 25 miles [40 km] S of Adelaide River Township, Mar 1964, *Lazarides* 7021 "common on Tippera clay soil with *Eucalyptus oligantha* and *Sorghum plumosum*. Erect, woody subshrub up to 5 ft. high. Buds reddish. Berries green. Leaves discolorous, greyish below." (Holotypus: CANB sub CANB 137814, 137815; isotypi: BRI sub BRI 239706 K, NT sub NT 30277) (**Figs. 8, 9**).

Erect shrub to 2 m high, rarely a vine, tendrils infrequent, shoots bearing pale cobwebby hairs. Leaves pedate (3–)5(–7) leaflets; central leaflet obovate, cuneate, acuminate to obtuse, (9–)11–15(–22.5) × (3.8–)4.5–7(–10) cm; lateral leaflets oblique, sometimes imperfectly divided (7.2–)8.5–12(–15.5) × (3.3–)4–6(–8) cm; central petiolule (0.2–)0.6–1.5(–2.2) cm long, lateral petiolule (0.4–)1.5–2.5(–5) cm long, petiole (0–)0.2–2(–3.3) cm long, often absent or much reduced. Leaflets with up to 19 shallow teeth on each side. Leaves when mature with long pale, thin-walled unicellular hairs resulting in a cobwebby appearance and short 1–3-celled thick-walled hairs on both surfaces. Very old specimens may be almost glabrous, particularly on the upper surface of the leaves. Stipules triangular 3 mm long, covered with long thin-walled unicellular hairs. Panicle usually has 7–9 main branches, tendril rarely present on the rachis. All branches bearing short thick-walled and long thin-walled trichomes, never glabrous. Pedicels terete (1–)1.5(–2) mm long, sometimes glabrous. Calyx spreading, 5-lobed. Corolla lobes 1.5 × 1.2 mm, red to dark red-brown at maturity. Filaments reddish, flattened 1–1.2 mm long, anthers yellow 0.5 mm long. Disk usually 5-ridged, ovary 1.5 × 1.2 mm, style short, conical, stigma minute, locules 2, with 2 anatropous ovules per locule. Berry, ovoid, dark purple to black, when dry 10–12 × 5–8 mm, 2 boat-shaped seeds per fruit 7.8 × 3.5–4 mm. **Fig. 8, 9.**

Northern Territory. Nightcliff, Dec 1964, *Rodd* (NSW); Thoraks's Reserve, approx. miles [16 km] SE of Darwin, Mar 1961, *Chippendale* (BRI, NT); Kapalga, Feb 1977, *Collins* BC277 (DNA, JCT); Arnhem Land, April–June 1928, *Basedow* 208 (K); Coomalie Creek, Jan 1969, *Byrnes* NB 1291 (L, NT); 26 miles [42 km] NNW of E1 Sharana mine, Feb 1973, *Lazarides* 7849 (CANB, NT, PERTH); 16 miles [26 km] SE of Pine Creek, Mar 1961, *Chippendale* (CANB, NT); 6 miles [10 km] N of Katherine, Feb 1961, *McKee* 8523 (CANB, K, NSW, NT); Katherine River, Dec 1886, *Giles* (MEL); 20 km S of Katherine, Jul 1978, *Jackes* (JCT); Hooker Creek, Mar 1960, *Walter* (NT).

This species has so far only been found in the Northern Territory particularly in the Katherine/Adelaide River area and around Darwin (Map 1). Soils vary from river alluvium to granitic soils to soils occurring at the base of limestone outcrops.

The habit of this species appears to be shrubby except when young, or when regrowing after fire or after damage by a bulldozer. Tendrils are infrequent. The leaflets are usually large, more than 9 cm long and discolorous. Leaflets are fewer than *A. acetosa*, average 5 in number and are often imperfectly divided. This is the only one of the three species in Australia where the length of the central petiolule and the petiole are similar, in the other two species the petiole is usually at least twice as long as the central petiolule.

3. *Ampelocissus gardineri* (Bailey) B. R. Jackes, comb. nov. Based on *Vitis gardineri* Bailey, Qd Flora 1:283 (1899). (**Fig. 10, 11**). **Type:** Walsh River, *Gardiner* (BRI 008577, BRI).

Cayratia calcicola Domin, Biblioth. Bot. 89:925 (1927). **Type:** Chillagoe, Nov 1910, *Domin* 6410 (PR).

Tendrilled vine, short conical spines common on the stem, short hairs as well as rusty cobwebby hairs present. Leaves pedate 9(-11) leaflets, central leaflet obovate, cuneate to broad lanceolate, acuminate (5.1-) 8.5-10.5(-16) × (2.4-)3-5(-7.8) cm; lateral leaflets oblique, main laterals (5-)7.9(-13.6) × (1.8-)3-4(-6.2) cm. Central petiolule (1.2-)1.5-2.5-(3.5) cm long, lateral petiolule (2.2-)3-4(-5) cm long, petiole (3.5-)5-7(-9) cm long. Leaflets with up to 11 serrations on each side, both surfaces covered with long rusty cobwebby hairs and simple 1-6-celled, thick-walled uniseriate hairs. Stipules triangular 3 mm long, some rusty cobwebby hairs present. Panicle usually with 5-7 main branches, these branches bearing both short and cobwebby hairs, sometimes almost glabrous or with only one hair type present. Pedicels terete 1.5-2 mm long, usually glabrous. Calyx spreading 5-lobed. Corolla 1.5-2 × 1.2 mm, red. Filaments flattened, pale red 1-1.2 mm long, anthers yellow 0.5 mm long. Disc 5-ridged; ovary 1.2-1.5 × 1.2 mm, style short conical, stigma flat expanding to 5 lobes after anthesis, locules 2, with 2 anatropous ovules per locule. Berry, ovoid, purple to black, when dry 9 × 8 mm, 2-3 boat-shaped, reddish seeds per fruit. **Fig. 10, 11.**

Queensland. COOK DISTRICT: Coen, Dec 1941, *Blake* 14526 (BRI); Palmer River, May 1899, *Roth* (BRI); between Chillagoe and Mungana, Jan 1972, *Hyland* 5839 (QRS); Chillagoe, Jan 1931, *Hubbard & Winders* 6745 (K); 1 km E of Pump Creek, E of Almaden, Mar 1979, *Jacks* (JCT); 2 miles [3 km] from Mutchilba on Stannary Hills Road, approx 20 miles [33 km] SW of Mareeba, Jan 1967, *Cunningham* (BRI).

The distinctive species with its rusty cobwebby hairs occurs only in North Queensland (Map 1) particularly in the Chillagoe area either in open woodland or deciduous vine thicket. Flowering usually occurs towards the end of the dry season in November and may continue through till March.

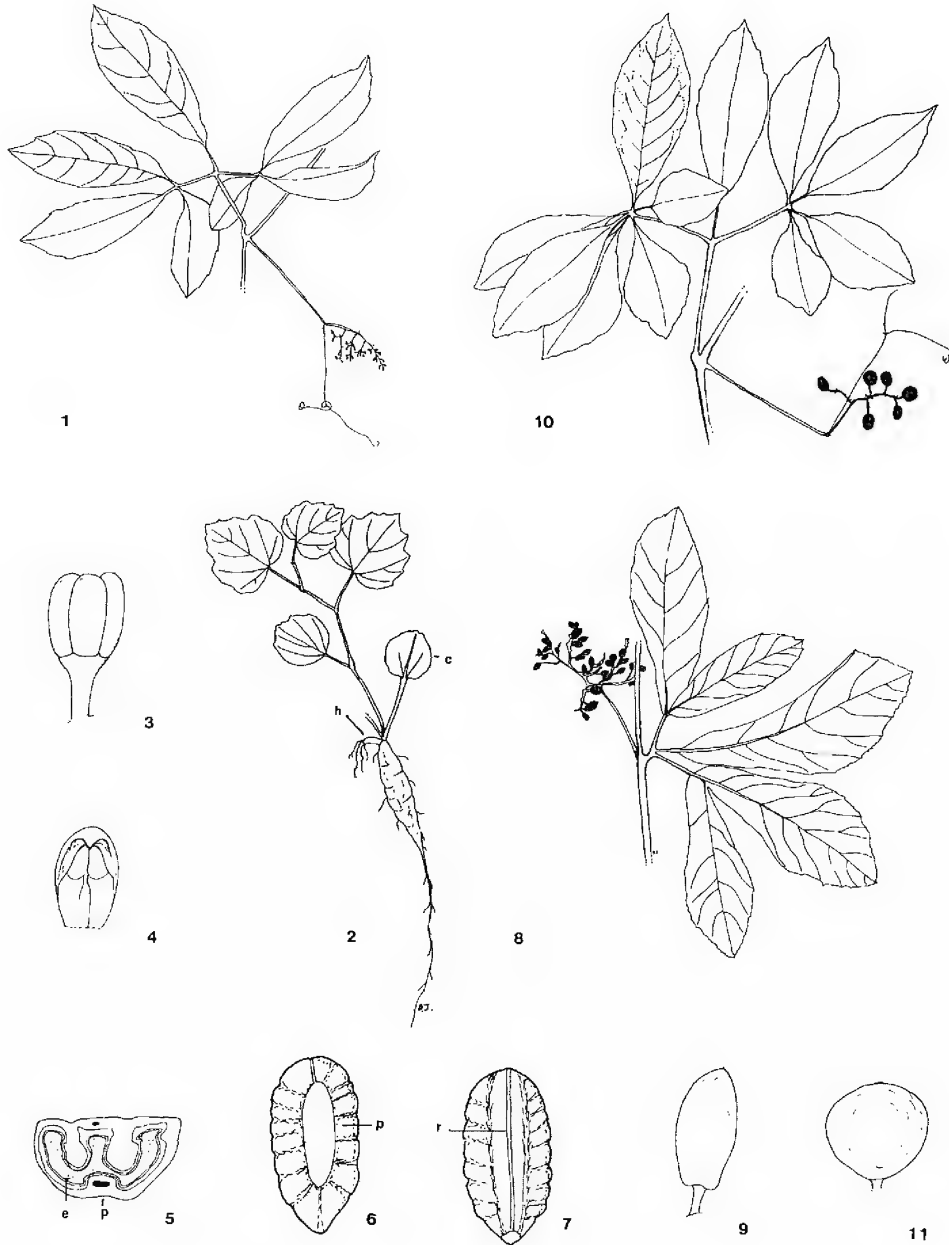
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Figs. 1–7, *Ampelocissus acetosa*. 1. leaf and inflorescence ($\times \frac{1}{4}$). 2. seedling ($\times \frac{1}{4}$), c—cotyledon, h—hypocotyl. 3. bud ($\times 5$). 4. petal and stamen ($\times 6$). 5. transverse section of seed ($\times 4$). e—endosperm, p—perichalaza. 6. seed, dorsal surface showing position of perichalaza (p) ($\times 2\frac{1}{2}$). 7. seed, ventral surface showing position of raphe (r) ($\times 2\frac{1}{2}$). Figs. 8, 9, *A. frutescens*, 8. leaf and inflorescence ($\times \frac{1}{4}$). 9. fruit ($\times 2$). Figs. 10, 11, *A. gardineri*. 10. leaf and inflorescence ($\times \frac{1}{4}$). 11. fruit ($\times 2$).